

Work Order ID 132355

Thursday, May 07, 2015 12:47:13 PM

132355

Page 1

Item ID: D212-664-107TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 5/7/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 5/7/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: MCS Date: MAY 07 2015

Run Start ***NR1***

QC: _____ Date: _____ Tooling: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-147	C

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA705

2-Turn first side as per Folio FA113

3-Blend transition ends only, **do not sand whole tube**:

FOLIO REV: PH

DWG REV: C

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

Handwritten: 1 15/06/10

110

QC1- Inspection performed by CMM

0.00

110

QC

Memo

0.00

Quality Control

Handwritten: 1 15/06/10

DQA:

Date:

15/10/19



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed:

Date:

15/10/02

Work Order update only

Work Order: <u>132355</u> Part No. <u>D212-664-107TRN</u> NCR No. <u>15-5320</u>		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☒ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☒</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																															
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Date : <u>15-08-20</u>		Step #: <u>100</u>		QTY Effective : <u>①</u>		MRB (QSI042) Approval <u>DAS</u> <u>12</u> <u>9-89</u> <u>15/6/3</u>																																																																	
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Wall measurement is over tolerance. R.C. material.				Acceptable. Deviation is within allowable of raw mat'l																																																																			
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Page 2

Item ID: D212-664-107TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 5/7/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 5/7/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120	MORI SEIKI CNC LATHE LARGE	0.00							
120									
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA705								
	2-Blend transition lines only, **do not sand whole tube**:								
	*Use mill bastard file, brush file repeatedly with file card.								
	*Do not use sandpaper coarser than 320 grit.								
	FOLIO REV: <u>AA</u>								
	DWG REV: <u>C</u>								
	3- Remove plugs and sand								
130	QC1- Inspection performed by CMM	0.00							
130									
QC	Memo	0.00							
Quality Control									

1  mm L
15/06/11

1  mm L
15/06/11

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

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Accept

N900040100

Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Turning Detail

Stop ***NS2***

Start Date: 5/7/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 5/7/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

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Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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140 QC8- Inspect parts - second check 0.00

140

QC

Memo

0.00

Quality Control

Accept

47

9-89

Reject

Qty

15/08/26

Reject

Number

Insp.

Stamp

145 0.00

145

Crosstubes

Memo

0.00

Crosstubes

GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

BL

15/09/21

150 0.00

150

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

BC

15/09/22

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

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Work Order ID 132355

Thursday, May 07, 2015 12:47:13 PM

132355

Page 4

Item ID: D212-664-107TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Turning Detail

Start Date: 5/7/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/7/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

160

QC21- Inspect part completeness to step on W/O

0.00

160

QC

Quality Control

Memo

0.00

15-9-22

170

Packaging

0.00

170

Packaging

Memo

0.00

Packaging

LOCATION : LG014

TSC 15/09/22

180

QC21- Final Inspection - Work Order Release

0.00

180

QC

Quality Control

Memo

0.00

MLJ SEP 23 2015

SH
20150922

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : ☐					

Picklist Print

Thursday, May 07, 2015 12:47:16 PM

Page 1

Work Order ID: 132355

132355

Parent Item: D212-664-107TRN

D212-664-107TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 5/7/2015

Required Date: 5/7/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD Verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6019-128		Manufactured	No			110	Each	83.0000	1	1			

D6019-128

Crosstube Material

Location

Loc Qty

Loc Code

LG003

83

107065

4

115201

26

115927

37

75635

15

79741

1

1 man. L 15/06/10

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

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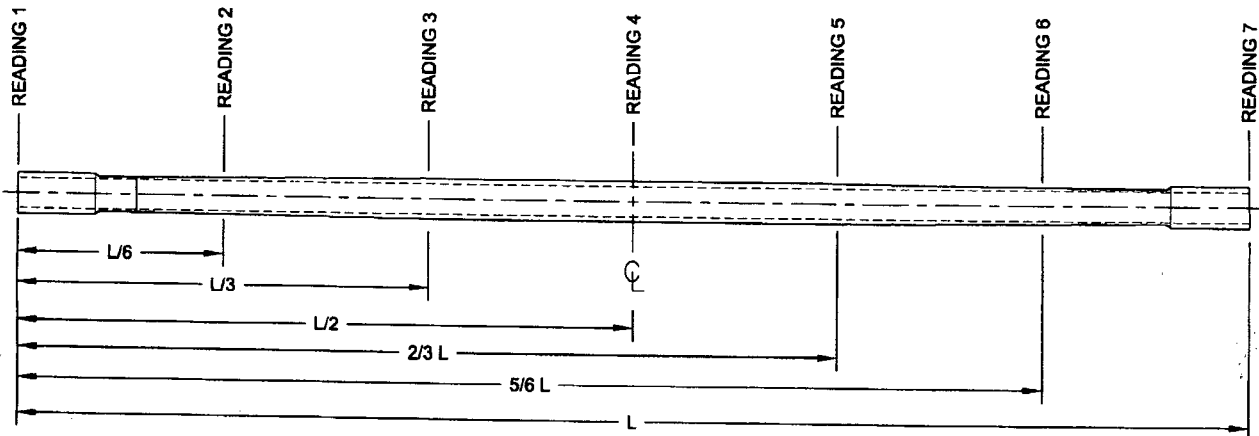
DART AEROSPACE LTD		Work Order: 132355
Description: Crosstube Assembly (205/212/412 Low Fwd)		Part Number: D212-664-147
Inspection Dwg: D212-664-147 Rev: 8 <i>ec</i>		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.313	+/-0.010	0.313	/		vern	CNC08
	2.360	+0.005/-0.000	2.363	/			
	2.360	+0.005/-0.000	2.363	/			
	2.366	+0.005/-0.000	2.369	/			
	2.473	+0.005/-0.000	2.477	/			
	2.573	+0.005/-0.000	2.576	/			
	2.673	+0.005/-0.000	2.678	/			
	2.750	+0.005/-0.000	2.750	/			
	2.750	+0.005/-0.000	2.750	/			
SIDE B	0.313	+/-0.010	0.313	/		vern	CNC08
	2.360	+0.005/-0.000	2.363	/			
	2.360	+0.005/-0.000	2.363	/			
	2.366	+0.005/-0.000	2.369	/			
	2.473	+0.005/-0.000	2.478	/			
	2.573	+0.005/-0.000	2.577	/			
	2.673	+0.005/-0.000	2.677	/			
	2.750	+0.005/-0.000	2.750	/			
	2.750	+0.005/-0.000	2.750	/			
	0.126.528	+/-0.020	0.126.528	/		tape	LG-11

DART AEROSPACE LTD		Work Order: 132355
Description: Crosstube Assembly (205/212/412 Low Fwd)		Part Number: D212-664-147
Inspection Dwg: D212-664-147 Rev: <i>EC</i>		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.130	.141	.121	.112	.029	0.048"
READING 2 L= 21	.164	.184	.139	.125	.059	
READING 3 L= 42	.313	.319	.360	.297	.029	
READING 4 L= 63	.316	.324	.320	.315	.009	
READING 5 L= 84	.312	.313	.310	.311	.003	
READING 6 L= 105	.161	.164	.163	.166	.004	
READING 7 L= 126	.126	.135	.122	.118	.016	

Aug Δ
0.146 0.021

Calibration Result

Actual Block Thickness: 100 - 750

Sitescan 250 Measured Thickness: 100 - 750

DAS
47

Measured by: <i>MM</i>
Date: 15/06/11

Audited by: 9-89
Date: 15-08-26

Prototype Approval: N/A
Date: N/A

Rev	Date	Change	Revised by	Approved
A	08.11.07	New Issue (P/O D212-664-107)	KJ/EC	
B	10.02.02	Dimension 126.528 was 126.53	KJ	
C	12.06.04	Wall thickness form added	KJ	

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2		D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7		2	D5017-1	SUPPORT
8	4	4	MS21920-25	CLAMP (OR MS21920-26)
9	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
10	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2
11	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: D212-664-147/-147B = 24.2 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

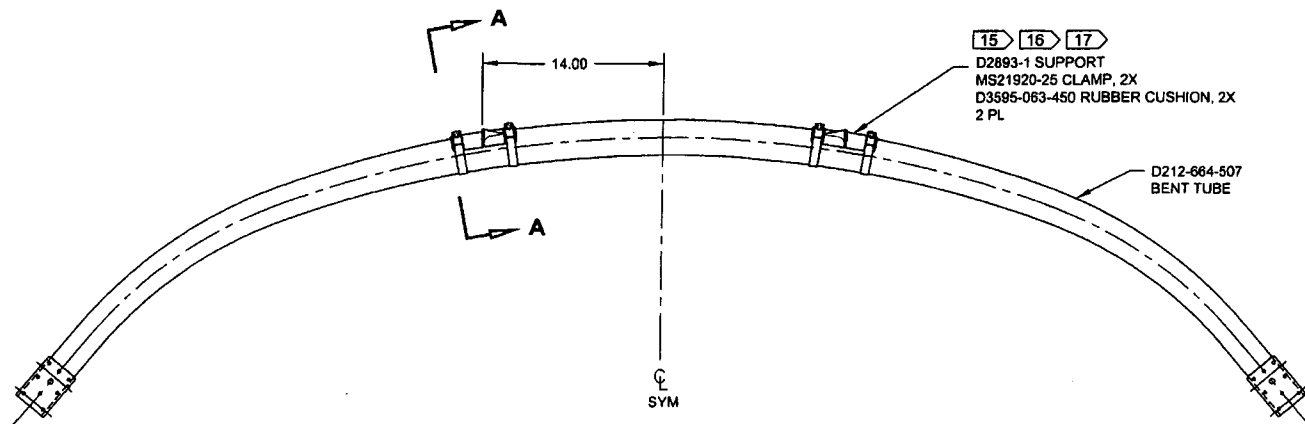
ASSEMBLY

- INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.
- INSTALL D2893-1 / D5017-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

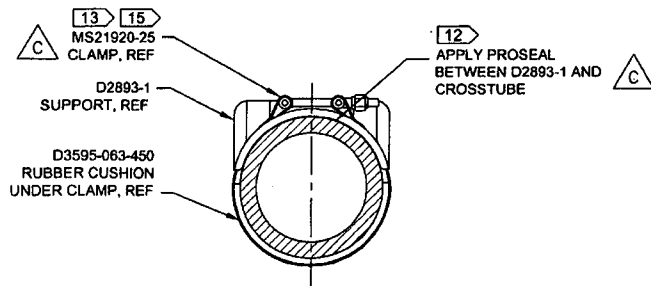
1323SS ML3
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2014-05-26

C	D5017-1 WAS D2893-1 (-147B). PROSEAL WAS MAGNOBOND. ADD SHEET 3. NOTE 16: ADD 72HR CURE & RETORQUE. CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3). INCORP DEO B-1	CP	14.04.01
B	REVISE GENERAL NOTES/PART LIST: UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	90		
DRAWN	90		
CHECKED	DW		
MFG. APPR.	Red		
APPROVED	1/10/14		
DE APPR.	1/10/14		
DATE	14.04.01		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D212-664-147 SHEET 1 OF 5 TITLE CROSSTUBE (205/212/412 LOW FWD) NTS COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			



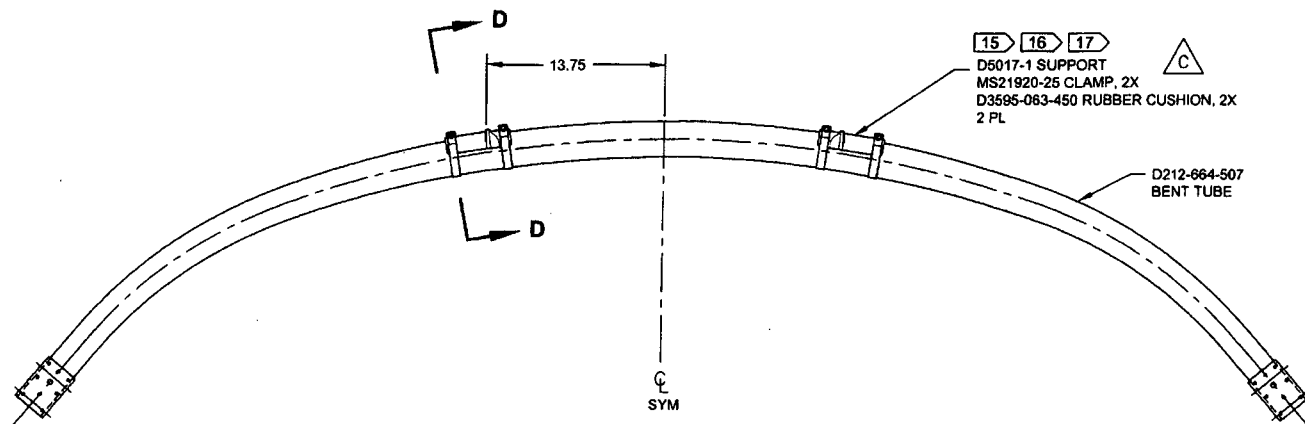
D212-664-147
ASSEMBLY DETAIL



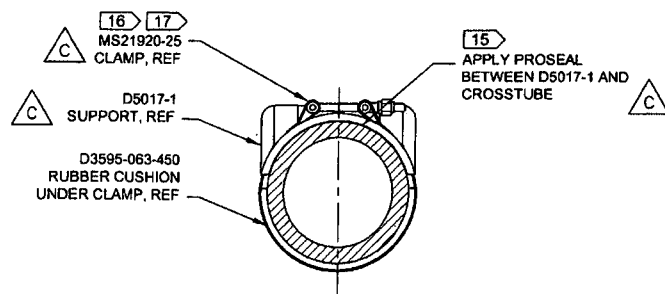
SECTION A-A
SCALE 4X

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2014-05-26
MD

DESIGN	<i>90</i>	DART AEROSPACE LTD	
DRAWN	<i>90</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DW</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>IM</i>	D212-664-147	SHEET 2 OF 5
APPROVED	<i>IM</i>	TITLE	SCALE
DE APPR.	<i>IM</i>	CROSSTUBE (205/212/412 LOW FWD)	NTS
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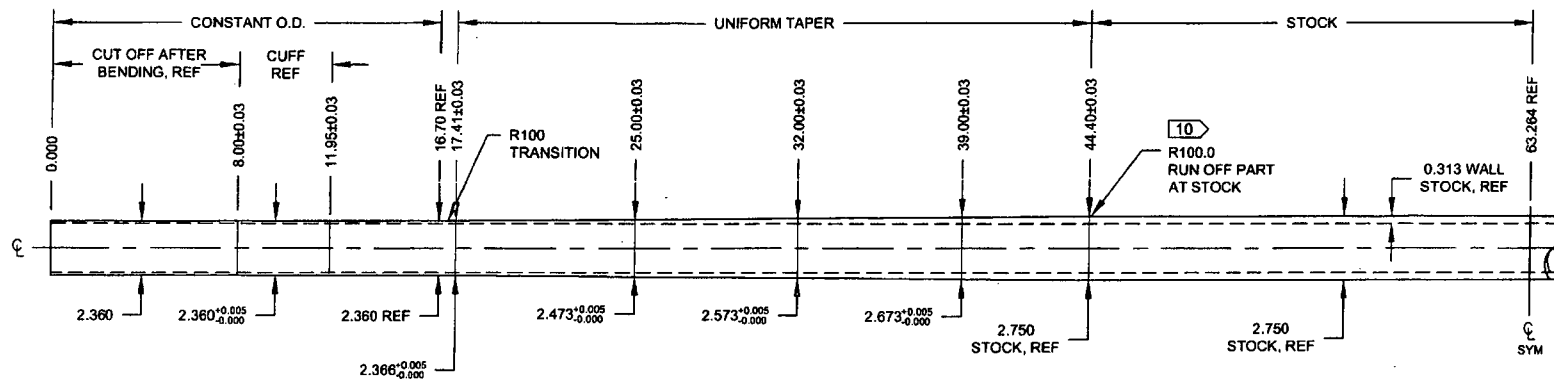
D212-664-147B
ASSEMBLY DETAIL C



SECTION D-D
SCALE 4X

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2014-05-26

DESIGN	<i>JP</i>	DART AEROSPACE LTD	
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CHECKED	<i>JP</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>JP</i>	D212-664-147	SHEET 3 OF 5
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE (205/212/412 LOW FWD)	NTS
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**D212-664-147TRN
TURNING DETAIL**

RELEASE
2014-05-26
WMD

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DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. C
MFG. APPR.		D212-664-147	SHEET 5 OF 5
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212/412 LOW FWD)	NTS
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